

JAPAN

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JIS B 2240 (1984) (English): Copper alloy pipe flanges

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The citizens of a nation must honor the laws of the land.

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JAPANESE INDUSTRIAL STANDARD

Basic Dimensions of Copper Alloy Pipe Flanges

JIS B 2240⁻¹⁹⁸⁴

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JAPANESE INDUSTRIAL STANDARD

J I S

Basic Dimensions of Copper Alloy Pipe Flanges

B 2240-1984

1. Scope

This Japanese Industrial Standard specifies the basic dimensions of copper alloy pipe flanges of nominal pressure of 5 K, 10 K and 16 K connecting pipes and valves which are used for general pipe arrangements of vapor, air, gas, water, oil, etc. (hereinafter referred to as the "flange").

Remark: The units and numerical values given in [] in this standard are in accordance with the International System of Units (SI), and are appended for reference.

2. Relation between States of Fluids and Maximum Working Pressures

The relation between states of fluids and maximum working pressure shall be in accordance with Table 1.

Applicable Standards:

JIS B 1001-Diameter of Bolt Hole and Counterbore

JIS B 2202-Dimensions for Pipe Flange Facing

JIS B 2203-Tolerances for Pipe Flanges

JIS G 3101-Rolled Steel for General Structure

JIS H 3300-Copper and Copper Alloy-Seamless Pipes and Tubes

JIS H 3320-Copper and Copper Alloy-Welded Pipes and Tubes

JIS H 5101-Brass Castings

JIS H 5111-Bronze Castings

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Table 1

Unit: MPa{kgf/cm²}

| Nominal pressure | State of fluid | | Maximum working pressure | Pressure of hydrostatic test (reference) (¹) |
|------------------|----------------|--|--------------------------|--|
| 5 K | 220°C | Vapor, air, gas, oil or pulsating water (accompanied by pressure variations) | 0.49{5} | 0.98{10} |
| | 185°C max. | | 0.56{6} | |
| | | Steady flow water at a temperature of not more than 120°C (accompanied by a few pressure variations) | 0.69{7} | |
| 10 K | 220°C | Vapor, air, gas, oil or pulsating water (accompanied by pressure variations) | 0.98{10} | 1.96{20} |
| | 185°C max. | | 1.18{12} | |
| | | Steady flow water at a temperature of not more than 120°C (accompanied by a few pressure variations) | 1.37{14} | |
| 16 K | 220°C | Vapor, air, gas, oil or pulsating water (accompanied by pressure variations) | 1.57{16} | 3.14{32} |
| | 185°C max. | | 1.86{19} | |
| | | Steady flow water at a temperature of not more than 120°C (accompanied by a few pressure variations) | 2.16{22} | |

Note (¹) This pressure of hydrostatic test is the test pressure in the case where flanges have been fitted with the pipe and is given for reference, except where the pressure otherwise specified.

Remark: Where the temperature or the pressure is in the intermediate range of values in the table, the maximum working pressure or temperature can be determined by interpolation.

3. Dimensions

The dimensions of flanges shall be in accordance with Attached Table 1 to Attached Table 3.

Further, the dimensional tolerances shall be in accordance with JIS B 2203.

4. Materials

The materials which have been taken as the basis of the specification of dimensions shall be as shown in Table 2.

Further, where the materials other than those of Table 2 are used, those materials shall be subjected to the agreement or the conference between the parties concerned to the delivery.

Table 2

| Nominal pressure | Solid flange | Slip-on flange (³) |
|------------------|---|--|
| 5 K | BC2, BC6 (²) and BC7 of JIS H 5111. | YBsC2(²) (⁴) of JIS H 5101, BC7 (⁵) of JIS H 5111. |
| 10 K | | |
| 16 K | | |

Notes (²) BC6 and YBsC2 are used where the state of fluid is at not more than 205°C.

(³) The material of slip-on flange in the case where the pipes are connected by welding shall be in accordance with the agreement or the conference between the parties concerned to the delivery.

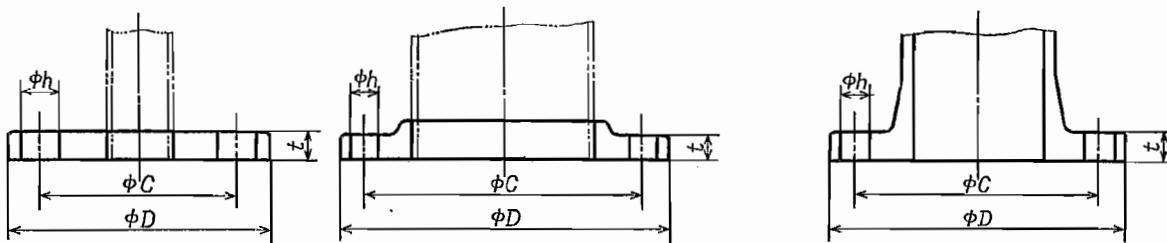
(⁴) Pb of YBsC2 should preferably be not more than 1 %.

(⁵) Where BC7 is used for slip-on brazing flange, the state of fluid should be over 205°C. Further, Sn and Pb should preferably be not more than 5 to 6 % and 1 % respectively.

Attached Table 1. Basic Dimensions of Flange of Nominal Pressure of 5 K

Slip-on flange

Solid flange



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Unit: mm

| Nominal diameter | Outside diameter of applied pipe | | Outside diameter of flange D | Thickness of flange t | Bolt hole | | | Nominal designation of screw thread of bolt |
|------------------|----------------------------------|--------|--------------------------------|-------------------------|-----------------------------|--------|--------------|---|
| | (1) | (2) | | | Diameter of bolt circle C | Number | Diameter h | |
| 10 | 16 | 12.70 | 75 | 9 | 55 | 4 | 12 | M 10 |
| 15 | 19 | 15.88 | 80 | 9 | 60 | 4 | 12 | M 10 |
| 20 | 25.4 | 22.22 | 85 | 10 | 65 | 4 | 12 | M 10 |
| 25 | 31.8 | 28.58 | 95 | 10 | 75 | 4 | 12 | M 10 |
| 32 | 38.1 | 34.92 | 115 | 12 | 90 | 4 | 15 | M 12 |
| 40 | 45 | 41.28 | 120 | 12 | 95 | 4 | 15 | M 12 |
| 50 | 50 | 53.98 | 130 | 14 | 105 | 4 | 15 | M 12 |
| 65 | 65, 75 | 66.68 | 155 | 14 | 130 | 4 | 15 | M 12 |
| 80 | 75, 76.2 | 79.38 | 180 | 14 | 145 | 4 | 19 | M 16 |
| (90) | 100 | — | 190 | 14 | 155 | 4 | 19 | M 16 |
| 100 | 100 | 104.78 | 200 | 16 | 165 | 8 | 19 | M 16 |
| 125 | 125 | 130.18 | 235 | 16 | 200 | 8 | 19 | M 16 |
| 150 | 150 | 155.58 | 265 | 18 | 230 | 8 | 19 | M 16 |
| (175) | 150 | — | 300 | 18 | 260 | 8 | 23 | M 20 |
| 200 | 200 | — | 320 | 20 | 280 | 8 | 23 | M 20 |
| (225) | 200 | — | 345 | 20 | 305 | 12 | 23 | M 20 |
| 250 | 250 | — | 385 | 22 | 345 | 12 | 23 | M 20 |
| 300 | — | — | 430 | 22 | 390 | 12 | 23 | M 20 |
| 350 | — | — | 480 | 24 | 435 | 12 | 25 | M 22 |
| 400 | — | — | 540 | 24 | 495 | 16 | 25 | M 22 |
| 450 | — | — | 605 | 24 | 555 | 16 | 25 | M 22 |
| 500 | — | — | 655 | 24 | 605 | 20 | 25 | M 22 |
| (550) | — | — | 720 | 26 | 665 | 20 | 27 | M 24 |
| 600 | — | — | 770 | 26 | 715 | 20 | 27 | M 24 |

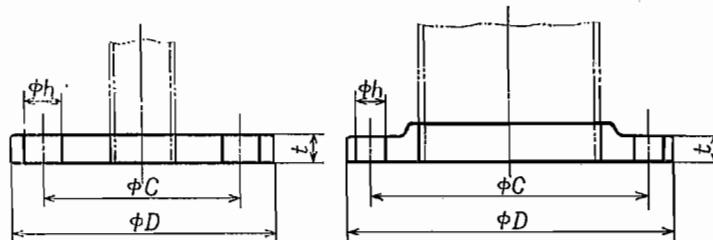
- Remarks 1. The flanges of a nominal diameter given in parentheses shall not be used as far as possible.
2. The column of outside diameter (1) of applied pipe shows the outside diameter of the representative pipe out of those specified in Table 7(1) of JIS H 3300 and Table 6 of JIS H 3320 and a pipe with an outside diameter other than specified in these tables may be applied. Where the pipe with an outside diameter other than these outside diameters is applied, it shall be subjected to the agreement or the conference between the parties concerned to the delivery. Provided that in all cases of these, the pipe with a larger outside diameter than the inside diameter d_2 of gasket shown in Reference Table 1 and Reference Table 2 shall not be applied.
- Further, the column of outside diameter (2) of applied pipe shows the outside diameter of pipe specified in Table 7 (2) of JIS H 3300.
3. The diameter of bolt hole h is in accordance with Grade 3 in JIS B 1001 where the nominal designation of screw thread of bolt is not more than M16.

4. The facing shall be the flat face of JIS B 2202.

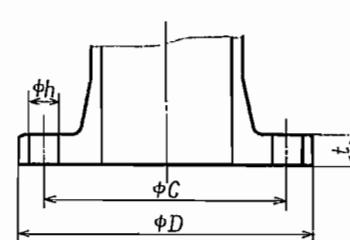
Reference: The materials of bolt and nut to be used for fastening a flange shall be SS41 of JIS G 3101, as a rule.

Attached Table 2. Basic Dimensions of Flange of Nominal Pressure of 10 K

Slip-on flange



Solid flange



Unit: mm

| Nominal diameter | Outside diameter of applied pipe | | Outside diameter of flange D | Thickness of flange t | Bolt hole | | | Nominal designation of screw thread of bolt |
|------------------|----------------------------------|--------|------------------------------|-----------------------|---------------------------|--------|------------|---|
| | (1) | (2) | | | Diameter of bolt circle C | Number | Diameter h | |
| 10 | 16 | 12.70 | 90 | 12 | 65 | 4 | 15 | M 12 |
| 15 | 19 | 15.88 | 95 | 12 | 70 | 4 | 15 | M 12 |
| 20 | 25.4 | 22.22 | 100 | 14 | 75 | 4 | 15 | M 12 |
| 25 | 31.8 | 28.58 | 125 | 14 | 90 | 4 | 19 | M 16 |
| 32 | 38.1 | 34.92 | 135 | 16 | 100 | 4 | 19 | M 16 |
| 40 | 45 | 41.28 | 140 | 16 | 105 | 4 | 19 | M 16 |
| 50 | 50 | 53.98 | 155 | 16 | 120 | 4 | 19 | M 16 |
| 65 | 65, 75 | 66.68 | 175 | 18 | 140 | 4 | 19 | M 16 |
| 80 | 75, 76.2 | 79.38 | 185 | 18 | 150 | 8 | 19 | M 16 |
| (90) | 100 | — | 195 | 18 | 160 | 8 | 19 | M 16 |
| 100 | 100 | 104.78 | 210 | 18 | 175 | 8 | 19 | M 16 |
| 125 | 125 | 130.18 | 250 | 20 | 210 | 8 | 23 | M 20 |
| 150 | 150 | 155.58 | 280 | 22 | 240 | 8 | 23 | M 20 |
| (175) | 150 | — | 305 | 22 | 265 | 12 | 23 | M 20 |
| 200 | 200 | — | 330 | 22 | 290 | 12 | 23 | M 20 |
| (225) | 200 | — | 350 | 22 | 310 | 12 | 23 | M 20 |
| 250 | 250 | — | 400 | 24 | 355 | 12 | 25 | M 22 |
| 300 | — | — | 445 | 24 | 400 | 16 | 25 | M 22 |
| 350 | — | — | 490 | 26 | 445 | 16 | 25 | M 22 |
| 400 | — | — | 560 | 28 | 510 | 16 | 27 | M 24 |
| 450 | — | — | 620 | 30 | 565 | 20 | 27 | M 24 |
| 500 | — | — | 675 | 30 | 620 | 20 | 27 | M 24 |
| (550) | — | — | 745 | 32 | 680 | 20 | 33 | M 30 |
| 600 | — | — | 795 | 32 | 730 | 24 | 33 | M 30 |

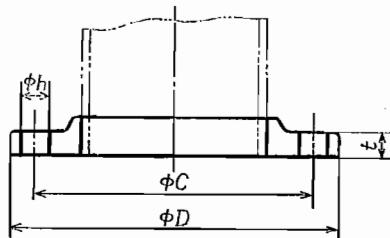
Remark: See the Remarks 1 to 4 of Attached Table 1. Provided that "where the nominal designation of screw thread of bolt is M30, Grade 2 of JIS B 1001 is applied" shall be appended to Remark 3.

Reference: See Reference of Attached Table 1.

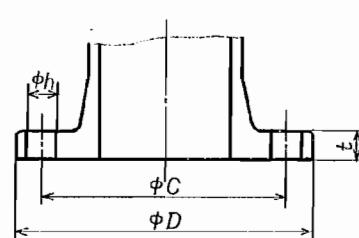
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Attached Table 3. Basic Dimensions of Flange of Nominal Pressure of 16 K

Slip-on flange



Solid flange



Unit: mm

| Nominal diameter | Outside diameter of applied pipe | | Outside diameter of flange D | Thickness of flange t | Bolt hole | | | Nominal designation of screw thread of bolt |
|------------------|----------------------------------|--------|------------------------------|-----------------------|---------------------------|--------|------------|---|
| | (1) | (2) | | | Diameter of bolt circle C | Number | Diameter h | |
| 10 | 16 | 12.70 | 90 | 12 | 65 | 4 | 15 | M 12 |
| 15 | 19 | 15.88 | 95 | 12 | 70 | 4 | 15 | M 12 |
| 20 | 25.4 | 22.22 | 100 | 14 | 75 | 4 | 15 | M 12 |
| 25 | 31.8 | 28.58 | 125 | 14 | 90 | 4 | 19 | M 16 |
| 32 | 38.1 | 34.92 | 135 | 16 | 100 | 4 | 19 | M 16 |
| 40 | 45 | 41.28 | 140 | 16 | 105 | 4 | 19 | M 16 |
| 50 | 50 | 53.98 | 155 | 16 | 120 | 8 | 19 | M 16 |
| 65 | 65, 75 | 66.68 | 175 | 18 | 140 | 8 | 19 | M 16 |
| 80 | 75, 76.2 | 79.38 | 200 | 20 | 160 | 8 | 23 | M 20 |
| (90) | 100 | — | 210 | 20 | 170 | 8 | 23 | M 20 |
| 100 | 100 | 104.78 | 225 | 22 | 185 | 8 | 23 | M 20 |
| 125 | 125 | 130.18 | 270 | 22 | 225 | 8 | 25 | M 22 |
| 150 | 150 | 155.58 | 305 | 24 | 260 | 12 | 25 | M 22 |
| 200 | 200 | — | 350 | 26 | 305 | 12 | 25 | M 22 |
| 250 | 250 | — | 430 | 28 | 380 | 12 | 27 | M 24 |
| 300 | — | — | 480 | 30 | 430 | 16 | 27 | M 24 |

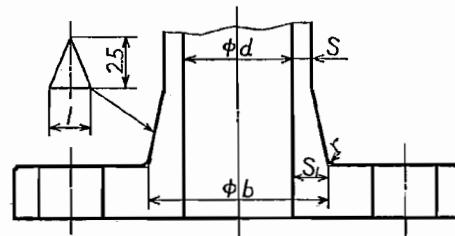
Remark: See Remarks 1 to 4 of Attached Table 1.

Reference: See Reference of Attached Table 1.

Reference

1. The Reference Table 1 shows the inside diameter of solid flange and dimensions of its neck part.

Reference Table 1. Dimensions of Solid Flange



Unit: mm

| Nominal diameter | Inside diameter <i>d</i> | Nominal pressure of 5 K | | | | Nominal pressure of 10K | | | | Nominal pressure of 16 K | | | |
|------------------|-----------------------------|-------------------------|----------------------|----------|----------|-------------------------|----------------------|----------|----------|--------------------------|----------------------|----------|----------|
| | | <i>S</i> | <i>S₁</i> | <i>b</i> | <i>r</i> | <i>S</i> | <i>S₁</i> | <i>b</i> | <i>r</i> | <i>S</i> | <i>S₁</i> | <i>b</i> | <i>r</i> |
| 10 | 10 | 4 | 7 | 24 | 5 | 4 | 9 | 28 | 5 | 4 | 9 | 28 | 5 |
| 15 | 15 | 4 | 7 | 29 | 5 | 5 | 9 | 33 | 5 | 5 | 9 | 33 | 5 |
| 20 | 20 | 4 | 8 | 36 | 5 | 5 | 10 | 40 | 5 | 5 | 10 | 40 | 5 |
| 25 | 25 | 4 | 8 | 41 | 6 | 5 | 10 | 45 | 6 | 5 | 10 | 45 | 6 |
| 32 | 32 | 5 | 9 | 50 | 6 | 6 | 11 | 54 | 6 | 6 | 11 | 54 | 6 |
| 40 | 40 | 5 | 9 | 58 | 6 | 6 | 11 | 62 | 6 | 6 | 11 | 62 | 6 |
| 50 | 50 | 5 | 10 | 70 | 6 | 6 | 12 | 74 | 6 | 6 | 12 | 74 | 6 |
| 65 | 65 | 5 | 10 | 85 | 6 | 6 | 12 | 89 | 6 | 7 | 13 | 91 | 6 |
| 80 | 80 | 6 | 11 | 102 | 6 | 7 | 13 | 106 | 6 | 8 | 14 | 108 | 6 |
| (90) | 90 | 6 | 11 | 112 | 6 | 7 | 13 | 116 | 6 | 8 | 15 | 120 | 6 |
| 100 | 100 | 6 | 12 | 124 | 6 | 7 | 14 | 128 | 6 | 9 | 16 | 132 | 6 |
| 125 | 125 | 7 | 12 | 149 | 8 | 8 | 15 | 155 | 8 | 10 | 17 | 159 | 8 |
| 150 | 150 | 7 | 13 | 176 | 8 | 9 | 16 | 182 | 8 | 11 | 19 | 188 | 8 |
| (175) | 175 | 8 | 14 | 203 | 8 | 10 | 17 | 209 | 8 | — | — | — | — |
| 200 | 200 | 8 | 14 | 228 | 8 | 11 | 18 | 236 | 8 | 13 | 21 | 242 | 8 |
| (225) | 225 | 9 | 15 | 255 | 8 | 12 | 18 | 261 | 8 | — | — | — | — |
| 250 | 250 | 9 | 16 | 282 | 8 | 12 | 20 | 290 | 8 | 15 | 24 | 298 | 10 |
| 300 | 300 | 10 | 17 | 334 | 8 | 14 | 21 | 342 | 8 | 17 | 26 | 352 | 10 |
| For general use | 350 | 340 | 10 | 18 | 376 | 10 | 15 | 23 | 386 | 10 | — | — | — |
| | 400 | 400 | 11 | 19 | 438 | 10 | 16 | 24 | 448 | 10 | — | — | — |
| | 450 | 450 | 11 | 19 | 488 | 10 | 16 | 24 | 498 | 10 | — | — | — |
| For general use | 500 | 500 | 12 | 21 | 542 | 10 | 17 | 25 | 550 | 10 | — | — | — |
| | (550) | 550 | 12 | 21 | 592 | 12 | 18 | 27 | 604 | 12 | — | — | — |
| | 600 | 600 | 13 | 21 | 642 | 12 | 20 | 27 | 654 | 12 | — | — | — |
| For ship | 350 | 335 | 10 | 18 | 371 | 10 | 15 | 23 | 381 | 10 | — | — | — |
| | 400 | 380 | 11 | 19 | 418 | 10 | 16 | 24 | 428 | 10 | — | — | — |
| | 450 | 430 | 11 | 19 | 468 | 10 | 16 | 24 | 478 | 10 | — | — | — |
| For ship | 500 | 480 | 12 | 21 | 522 | 10 | 17 | 25 | 530 | 10 | — | — | — |
| | 550 | 530 | 12 | 21 | 572 | 12 | 18 | 27 | 584 | 12 | — | — | — |
| | 600 | 580 | 13 | 21 | 622 | 12 | 20 | 27 | 634 | 12 | — | — | — |

Remark: The flange with a nominal diameter given in parentheses shall not be used as far as possible.

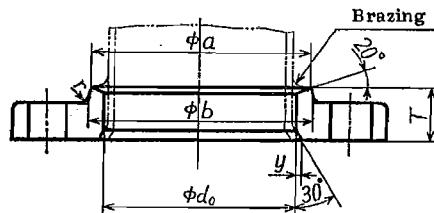
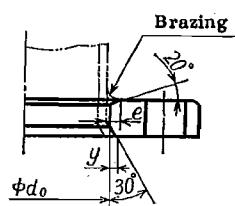
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2. The Reference Table 2 shows an example of the diameter of inserting hole of the slip-on brazing flange and the dimensions of hub part and the flared part at the pipe end.

Reference Table 2. Dimensions of Slip-on Brazing Flange

One of nominal pressure of 5 K and nominal diameter 10 to 125 and one of nominal pressure of 10 K and nominal diameter 10 to 100.

One of nominal pressure of 5 K and nominal diameter 150 to 200, one of nominal pressure of 10 K and nominal diameter 125 to 200, and further, one of nominal pressure 16 K.



Unit: mm

| Nominal diameter | Outside diameter of applied pipe | Diameter of inserting hole d_0 | Nominal pressure of 5K | | | | | Nominal pressure of 10K | | | | | Nominal pressure of 16K | | | | | | |
|------------------|----------------------------------|----------------------------------|------------------------|-----------------|-----|---|-----|-------------------------|----|-----------------|-----|---|-------------------------|---|----|-----------------|-----|---|---|
| | | | T | Diameter of hub | | r | y | e | T | Diameter of hub | | r | y | e | T | Diameter of hub | | r | y |
| | | | | a | b | | | | | a | b | | | | | a | b | | |
| 10 | 12.70 | 13.2 | — | — | — | — | 1.5 | 4 | — | — | — | — | 2 | 4 | 20 | 22 | 26 | 4 | 2 |
| 15 | 15.88 | 16.4 | — | — | — | — | 1.5 | 4 | — | — | — | — | 2 | 4 | 20 | 26 | 30 | 4 | 2 |
| 20 | 22.22 | 22.7 | — | — | — | — | 1.5 | 4 | — | — | — | — | 2 | 5 | 22 | 33 | 37 | 4 | 2 |
| 25 | 28.58 | 29.1 | — | — | — | — | 1.5 | 4 | — | — | — | — | 2 | 5 | 22 | 39 | 43 | 4 | 2 |
| 32 | 34.92 | 35.4 | — | — | — | — | 1.5 | 5 | — | — | — | — | 2 | 5 | 24 | 45 | 49 | 4 | 2 |
| 40 | 41.28 | 41.8 | — | — | — | — | 1.5 | 5 | — | — | — | — | 2 | 5 | 24 | 52 | 56 | 4 | 2 |
| 50 | 53.98 | 54.5 | — | — | — | — | 2 | 5 | — | — | — | — | 3 | 6 | 26 | 67 | 71 | 6 | 3 |
| 65 | 66.68 | 67.2 | — | — | — | — | 2 | 5 | — | — | — | — | 3 | 6 | 28 | 81 | 85 | 6 | 3 |
| 80 | 79.38 | 79.9 | — | — | — | — | 2 | 5 | — | — | — | — | 3 | 7 | 30 | 95 | 101 | 6 | 3 |
| 100 | 104.78 | 105.8 | — | — | — | — | 3 | 6 | — | — | — | — | 3 | 7 | 32 | 121 | 127 | 6 | 3 |
| 125 | 130.18 | 131.2 | — | — | — | — | 3 | 6 | 30 | 146 | 152 | 6 | 3 | — | 34 | 148 | 154 | 8 | 4 |
| 150 | 155.58 | 156.6 | 28 | 168 | 174 | 6 | 3 | — | 32 | 172 | 178 | 6 | 3 | — | 36 | 176 | 182 | 8 | 4 |

Remark: The outside diameter of applied pipe shall be in accordance with the basic outside diameter of copper pipe of Table 7 (2) in JIS H 3300.

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3. The classification and dimensions of gaskets are shown in the following:

- (1) Classification of Gaskets The gaskets shall be classified as shown in Reference Table 3 according to the used temperature for the nominal pressure of 5 K, 10 K and 16 K respectively.

Reference Table 3

| Used temperature | Classification of gaskets |
|---------------------------|--|
| 100°C max. | Rubber sheet gasket (¹) Cloth-inserted rubber sheet gasket (¹)(²) |
| Over 100°C to 220°C incl. | Asbestos joint sheet gasket (³) |

Note (¹) Select the rubber material according to the property of fluid.

For instance, use an oil resistant rubber for a fluid of oil system.

(²) Do not use for a fluid of gas system.

(³) Use a gasket with little leakage due to penetration for a fluid of gas system.

Remark: The gasket of rubber system should preferably be used where the nominal pressure is not more than 10 K and the state of fluid is not higher than 100°C.

- (2) Dimensions of Gasket The dimensions of gasket shall be of the full-face gasket as shown in Reference Table 1 of JIS B 2202.

The thickness of gasket should preferably be 2 mm for rubber sheet gasket and cloth-inserted rubber sheet gasket, and 1.5 mm or 3 mm for asbestos joint sheet gasket.

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